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IMPACT OF EGG VIABILITY, EGG PARASITISM, AND VIRUS ON 1974 DOUGLAS-FIR TUSSOCK MOTH DEFOLIATION POTENTIAL IN WESTERN MONTANA

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by

Scott Tunnock, Entomologist
Forest Insect and Disease Branch

ABSTRACT

Douglas-fir tussock moth egg mass studies during winter 1974 indicate that natural factors such as low egg viability, egg parasitism, and virus do not alter the potential for heavy defoliation in two sections south of Frenchtown and one section northwest of Lolo, Montana.

INTRODUCTION

The Douglas-fir tussock moth, *Orgyia pseudotsugata* McD., defoliated two stands of Douglas-fir, *Pseudotsuga menziesii* var. *glauca* (Beissen.) Franco, near Missoula, Montana, in 1973. Egg mass surveys were made during November 1973 to determine the extent of the infestations and to assess potential defoliation in 1974 (Tunnock and Kohler 1974). As part of this survey, supplemental collections of new egg masses were made to determine if low egg viability, high egg parasitism, and high percent mortality due to nucleopolyhedrosis virus would effect defoliation potential. These studies were made during winter 1974.

METHODS

During the fall egg mass survey (Tunnock and Kohler 1974) five new egg masses were collected from each of the two sections south of Frenchtown and one section northwest of Lolo, Montana. These were stored in a cooler at 35° F. until February 1974. In February, half of each egg mass was placed in a Petri dish and incubated at 78° F. and 30 percent relative humidity. Eggs usually hatched after 14 days. All larvae and egg parasites were counted in each dish. From 20 to 30 larvae were

were retained in the Petri dish, and the egg mass was placed in another Petri dish to complete hatching. Larvae were fed on artificial media and kept in the incubator for 14 days. At the end of 14 days each dish was examined for dead larvae. Each dead larva was smeared on a slide and examined under a compound microscope for presence of polyhedra (bodies containing virus rods). Percentage of larvae killed by virus was computed for each plot.

Egg masses that were transferred to a second Petri dish were dissected and all unhatched eggs counted per mass. Any additional emerged larvae and parasites in each dish were counted. From these data, average number of eggs per mass, percent nonviable eggs, and percent egg parasitism were determined for each plot.

A partial life table (Table 1) was prepared from the above data to determine estimated larvae (viable eggs) per 1,000 square inches of foliage on each plot. The virus level and estimated larval density per 1,000 square inches of foliage were used in a key (Tunnock and Kohler 1974) which established if an area would suffer heavy defoliation in 1974 (high risk).

RESULTS

The risk for heavy defoliation in 1974 was "high" in the two sections of Douglas-fir south of Frenchtown and the one section northwest of Lolo, Montana (Table 1, Fig. 1). Percent nonviable eggs ranged from 52.2 to 62.8, and egg parasitism ranged from 0.9 to 6.6 percent. Two species of egg parasites were recovered, *Telenomus californicus* Ashm.[1/] (Hymenoptera: Scelionidae) and *Trichogramma minutum* Riley[2/] (Hymenoptera: Trichogrammatidae). *T. californicus* was the more abundant of the two.

Percent virus was low from the egg masses and ranged from 1.0 to 5.3. More than 30 percent virus in an area is needed to classify it as "low risk" (Table 1).

REFERENCE CITED

Tunnock, S., and Steve Kohler, 1974. Potential for defoliation by Douglas-fir tussock moth in western Montana in 1974. USDA Forest Service, Div. State and Priv. Forestry, Fed. Bldg., Missoula, Mont., Report No. 74-2.

1/ Determined by Paul Marsh, USDA, Agricultural Research Service, Insect Identification and Parasite Introduction Research Branch, Beltsville, Maryland.

2/ Determined by B. D. Burks, USDA, Agricultural Research Service, Insect Identification and Parasite Introduction Research Branch, Beltsville, Maryland.

Table 1.--Data from western Montana Douglas-fir tussock moth egg masses hatched in the laboratory during winter 1974

(1) Plot location			(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
T.	R.	Sec.	New egg masses/1000 sq. in. foliage	Mean number eggs/ mass	(2x3) Eggs/ 1000 sq. inches	Percent non-viable eggs	Percent egg para-sitism	Estimated larval density/ 1000 sq. in. at egg hatch	Percent virus	Estimated larvae/1000 sq. in. after virus	Risk* (high or low)
						FRENCHTOWN					
14N	21W	22	1.21	166	200.8	60.3	0.9	79.0	1.0	78.2	High
14N	21W	10	.37	224	82.9	52.2	3.9	38.1	5.3	36.1	High
						LOLO					
12N	20W	21	2.54	144	365.8	62.8	6.6	127.2	2.4	124.2	High

*Risk of defoliation is "high" on plot if estimated larval density exceeds 20 larvae per 1,000 square inches of foliage or if virus levels are less than 30 percent in Class III or IV areas or less than 50 percent in Class I or II areas.

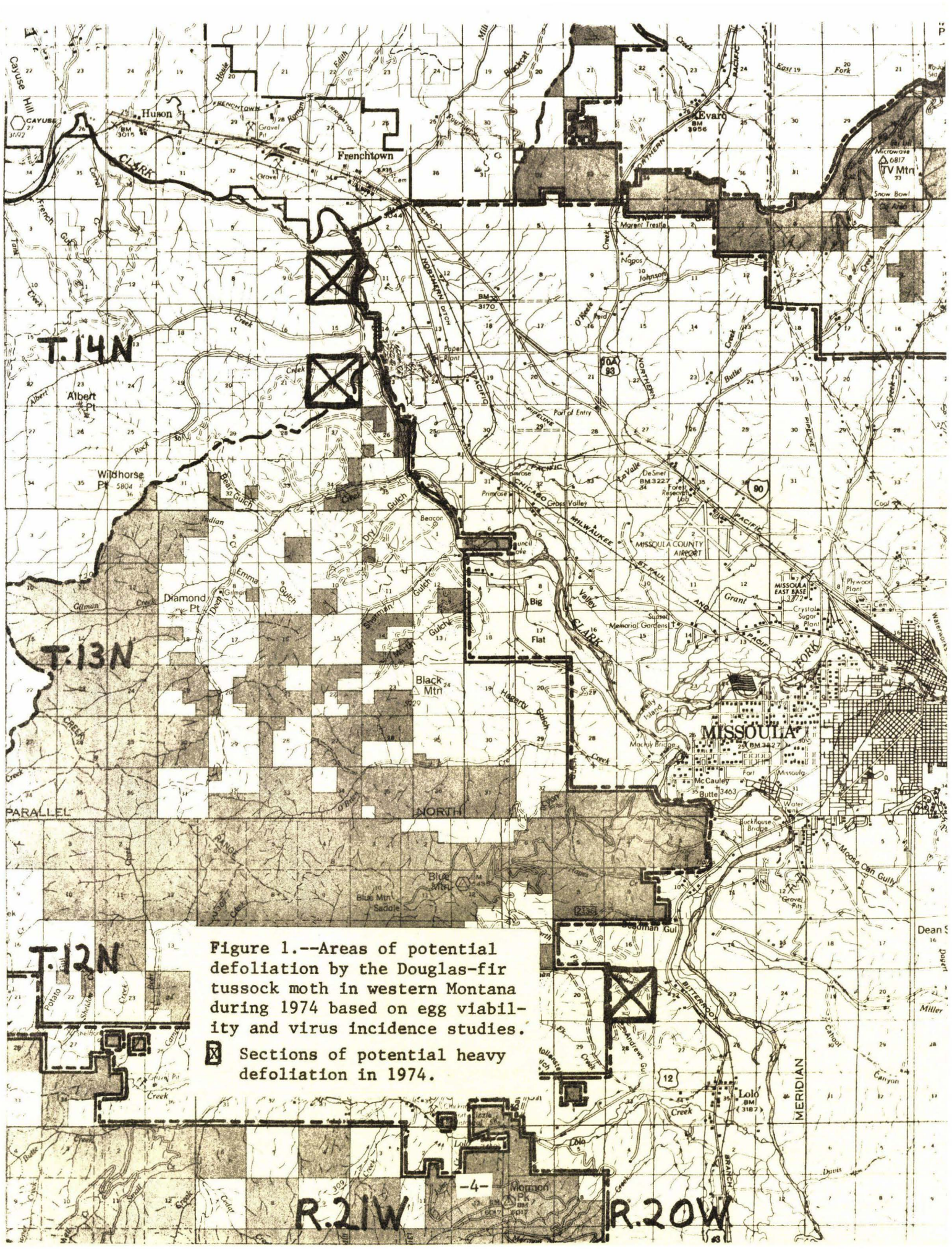

Figure 1.--Areas of potential defoliation by the Douglas-fir tussock moth in western Montana during 1974 based on egg viability and virus incidence studies.

Sections of potential heavy defoliation in 1974.